Weather Imagery - Image TileServer - v3.0

Domain Portfolio: Weather Imagery | Domain: Raster-Tile | Usage Classification: Standard | API Name: Image TileServer - v3.0

Geography: Regionally Mixed

Attribution Required: Yes / Conditional

Attribution Requirements:
Radar Layer - Australia: Requires Attribution: “Australian Bureau of Meteorology” brand/trademark logo and Weblink. www.bom.gov.au
Canada: Requires Attribution: “Environment and Climate Change Canada”
The terms and conditions are specified here:
http://dd.meteo.gc.ca/doc/LICENCE_GENERAL.txt

Overview

The Image Tile Server API features a comprehensive set of tile-based products utilizing data from including radar, satellite, current conditions, and forecast information based on complex algorithms developed from TWC observation systems. It provides the ability to request tiles of varying resolution. The Image Tile Server product provides access to our most popular mapping layers pre-rendered with appropriate palettes, ready to be applied to your base map. Layers are served as precut 256x256 png image files for interactive maps and other data visualization, addressed according to a XYZ tile address schema.

The process of identifying available layer data and corresponding layer tiles requires a 3-step process.

1. Get Inventory Series List which returns the valid timeslice and metadata for each tile layer.
2. Use the appropriate valid timeslice (ts & fts) as input to the timeslice parameters, and base map tile address as input into the XYZ parameter of the layer tile request.
3. Get specified Layer Tiles using the data from the Inventory Series response as input into the ‘ts’ and ‘fts’ parameters.

HTTP Headers and Data Lifetime - Caching and Expiration

For details on appropriate header values as well as caching and expiration definitions, please see **The Weather Company Data | API Common Usage Guide**.

Update Frequency

In the Inventory Series each available layer includes a time slice (ts); The time slice (ts) is an Epoch formatted time stamp. This timestamp is used as input into the atomic layer api request for the available layers (with the given timestamp). Each layer timestamp is updated on a frequency dependent on the layer type (Observation, Forecast). A new Inventory Series request should be made at correlating intervals to the Layer type used in the client application.

For example: if the client application is using both Observation AND Forecast layers, then the Inventory Series API should be made in at least 5 minute intervals, however if only Forecast layers are used, then an updated Inventory Series could be extended out to 30 minute intervals.

Layer Type	Update Frequency
Observation Layers	5 Minutes
Forecast Layers	30 Minutes
Composite Radar & Satellite Layers	5 Minutes

URL Construction

Atomic API URL Examples:
Inventory Series List: Required Parameters: apiKey **Optional Parameters:** cb, filter https://api.weather.com/v3/TileServer/series/productSet/PPAcore?apiKey=**yourApiKey**
https://api.weather.com/v3/TileServer/**series/productSet/PPAcore**?apiKey=**yourApiKey** Optional **cb** parameter can be added (optional) if a jsonp callback is required. Get Inventory Series List with optional cb parameter: https://api.weather.com/v3/TileServer/**series/productSet/PPAcore?cb=padding_wrapper**&apiKey=**yourApiKey** Optional **filter** parameter can be added (optional) to filter results on a specific product: https://api.weather.com/v3/TileServer/**series/productSet/PPAcore?filter=satrad**&apiKey=**yourApiKey**
Current Conditions Layer: Required Parameters: ts, X:Y:Z, apiKey https://api.weather.com/v3/TileServer/tile/<**layer_name**>?ts=<**ts**>&xyz=<**X:Y:Z**>&apiKey=**yourApiKey**
https://api.weather.com/v3/TileServer/tile/**radar**?ts=**1437426000**&xyz=**0:0:1**&apiKey=**yourApiKey**
Forecast Layer: Required Parameters: ts, fts, X:Y:Z, apiKey https://api.weather.com/v3/TileServer/tile/<**layer_name**>?ts=<**ts**>&fts=<**fts**>&xyz=<**X:Y:Z**>&apiKey=**yourApiKey**
https://api.weather.com/v3/TileServer/tile/**radarFcst**?ts=**1428948600**&fts=**1428949000**&xyz=**0:0:1**&apiKey=**yourApiKey**

Layer Name	URL Example
Inventory Series	https://api.weather.com/v3/TileServer/**series/productSet/PPAcore**?apiKey=**yourApiKey**
Current Conditions Layers	
Current Conditions Layer - Dewpoint	https://api.weather.com/v3/TileServer/tile/**dewpoint**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Conditions Layer - Feels Like	https://api.weather.com/v3/TileServer/tile/**feelsLike**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Conditions Layer - Precipitation 1 Hour	https://api.weather.com/v3/TileServer/tile/**precip1hr**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Conditions Layer - Precipitation 24 Hour	https://api.weather.com/v3/TileServer/tile/**precip24hr**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Conditions Layer - Road Weather Index	https://api.weather.com/v3/TileServer/tile/**rwi**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Conditions Layer - Snow 1 Hour	https://api.weather.com/v3/TileServer/tile/**snow1hr**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Conditions Layer - Snow 24 Hour	https://api.weather.com/v3/TileServer/tile/**snow24hr**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Conditions Layer - Snow Coverage 1 Hour Contiguous US	https://api.weather.com/v3/TileServer/tile/**snowCoverageConus1hr**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Conditions Layer - Temperature	https://api.weather.com/v3/TileServer/tile/**temp**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Conditions Layer - Temperature Change	https://api.weather.com/v3/TileServer/tile/**tempChange**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**

Current Conditions Layer - Temperature Maximum	https://api.weather.com/v3/TileServer/tile/**maxTemp**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Conditions Layer - Temperature Minimum	https://api.weather.com/v3/TileServer/tile/**minTemp**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Conditions Layer - Ultraviolet (UV)	https://api.weather.com/v3/TileServer/tile/**uv**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Conditions Layer - Wind Speed	https://api.weather.com/v3/TileServer/tile/**windSpeed**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Conditions Layer - Wind Speed Gust	https://api.weather.com/v3/TileServer/tile/**windSpeedGust**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Conditions Layer - Wind Speed Non-Masked **(See Note below)**	https://api.weather.com/v3/TileServer/tile/**windSpeedNM**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Radar Layer - Radar (North American Composite)	https://api.weather.com/v3/TileServer/tile/**radar**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Radar Layer - Radar Australia (Attribution Required)	https://api.weather.com/v3/TileServer/tile/**radarAustralian**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Radar Layer - Radar Europe	https://api.weather.com/v3/TileServer/tile/**radarEurope**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Radar Layer - Radar Mosaic	https://api.weather.com/v3/TileServer/tile/**twcRadarMosaic**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Radar Layer - Radar Mosaic High-Coverage	https://api.weather.com/v3/TileServer/tile/**twcRadarHcMosaic**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Satellite Layer - Satellite	https://api.weather.com/v3/TileServer/tile/**sat**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Satellite Layer - Satellite - Thermal IR	https://api.weather.com/v3/TileServer/tile/**thermalSat**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Satellite Layer - Satellite Europe - Longwave Infrared	https://api.weather.com/v3/TileServer/tile/**euIrSat**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Satellite Layer - Satellite Europe - Visible Spectrum	https://api.weather.com/v3/TileServer/tile/**euVisSat**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Satellite Layer - Satellite - Visible Spectrum	https://api.weather.com/v3/TileServer/tile/**satVis**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Satellite Layer - Satellite U.S.	https://api.weather.com/v3/TileServer/tile/**ussat**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Current Satellite / Radar Layer - Satellite & Radar	https://api.weather.com/v3/TileServer/tile/**satrad**?ts=<ts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Forecast Layers	
Forecast Layer - Clouds	https://api.weather.com/v3/TileServer/tile/**cloudsFcst**?ts=<ts>&fts=<fts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Forecast Layer - Dewpoint	https://api.weather.com/v3/TileServer/tile/**dewpointFcst**?ts=<ts>&fts=<fts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Forecast Layer - Feels Like	https://api.weather.com/v3/TileServer/tile/**feelsLikeFcst**?ts=<ts>&fts=<fts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Forecast Layer - Precipitation 1 Hour Cumulative	https://api.weather.com/v3/TileServer/tile/**precip1hrCumulativeFcst**?ts=<ts>&fts=<fts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Forecast Layer - Precipitation 24 Hour	https://api.weather.com/v3/TileServer/tile/**precip24hrFcst**?ts=<ts>&fts=<fts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Forecast Layer - Precipitation and Snow 1 Hour Cumulative	https://api.weather.com/v3/TileServer/tile/**precipAndSnow1hrCumulativeFcst**?ts=<ts>&fts=<fts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Forecast Layer - Snow 1 Hour Cumulative	https://api.weather.com/v3/TileServer/tile/**snow1hrCumulativeFcst**?ts=<ts>&fts=<fts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Forecast Layer - Snow 24 Hour	https://api.weather.com/v3/TileServer/tile/**snow24hrFcst**?ts=<ts>&fts=<fts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Forecast Layer - Temperature	https://api.weather.com/v3/TileServer/tile/**tempFcst**?ts=<ts>&fts=<fts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**

Forecast Layer - Temperature 24 Hour Maximum	https://api.weather.com/v3/TileServer/tile/**24hrMaxTempFcst**?ts=<ts>&fts=<fts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Forecast Layer - Temperature 24 Hour Minimum	https://api.weather.com/v3/TileServer/tile/**24hrMinTempFcst**?ts=<ts>&fts=<fts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Forecast Layer - Temperature Hourly	https://api.weather.com/v3/TileServer/tile/**tempHourlyFcst**?ts=<ts>&fts=<fts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Forecast Layer - Thunder 12 Hour	https://api.weather.com/v3/TileServer/tile/**thunder12hrFcst**?ts=<ts>&fts=<fts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Forecast Layer - Ultraviolet (UV)	https://api.weather.com/v3/TileServer/tile/**uvFcst**?ts=<ts>&fts=<fts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Forecast Layer - Ultraviolet (UV) 12 Hour	https://api.weather.com/v3/TileServer/tile/**uv12hrFcst**?ts=<ts>&fts=<fts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Forecast Layer - Wind Speed	https://api.weather.com/v3/TileServer/tile/**windSpeedFcst**?ts=<ts>&fts=<fts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Forecast Layer - Wind Speed 12 Hour	https://api.weather.com/v3/TileServer/tile/**windSpeed12hrFcst**?ts=<ts>&fts=<fts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Forecast Layer - Wind Speed Non-Masked **(See Note below)**	https://api.weather.com/v3/TileServer/tile/**windSpeedFcstNM**?ts=<ts>&fts=<fts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Forecast Lifestyle Index Layer - Aches and Pains	https://api.weather.com/v3/TileServer/tile/**achesPainsFcst**?ts=<ts>&fts=<fts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Forecast Lifestyle Index Layer - Breathing	https://api.weather.com/v3/TileServer/tile/**breathingFcst**?ts=<ts>&fts=<fts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Forecast Lifestyle Index Layer - Grass Pollen	https://api.weather.com/v3/TileServer/tile/**grassPollenFcst**?ts=<ts>&fts=<fts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Forecast Lifestyle Index Layer - Ragweed Pollen	https://api.weather.com/v3/TileServer/tile/**ragweedPollenFcst**?ts=<ts>&fts=<fts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Forecast Lifestyle Index Layer - Tree Pollen	https://api.weather.com/v3/TileServer/tile/**treePollenFcst**?ts=<ts>&fts=<fts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Forecast Radar Layer - Radar	https://api.weather.com/v3/TileServer/tile/**radarFcst**?ts=<ts>&fts=<fts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**
Forecast Satellite / Radar Layer - Satellite & Radar	https://api.weather.com/v3/TileServer/tile/**satradFcst**?ts=<ts>&fts=<fts>&xyz=<X:Y:Z>&apiKey=**yourApiKey**

NOTE: Many products make use of a land/sea mask to exclude data over bodies of water. “Non-Masked” products omit this mask, so their resulting images **do** include data over bodies of water.

Retrieving Tiles:

Request a 256x256 image tile or UTFGrid for a given layer. The XYZ parameters must be integer coordinates describing the tile position according to the XYZ tiling scheme. Once the client has parsed the series list and determined what layer they wish to display, they then need to request the appropriate tiles for their base map viewport. If the viewport contains tile addresses outside of this window, no call is needed as the tile will be empty. Clients will use the data returned in the Inventory Series response as input into the layer tile request via a series of calls, providing the layer, timestamp, and the X:Y:Z tile address.

Data Elements & Definitions

Field Name	Description	Type	Sample
Inventory Series			

seriesInfo	The seriesInfo describes the available layers and the relevant information in the response to make the secondary call for the actual tiles and include:
	• layer name: e.g. “clouds”
	• native zoom level: e.g. “nativeZoom”:6,
	• max zoom level: e.g. “maxZoom”:11,
		object	{
			"seriesInfo": {
			"clouds": {},
			"windSpeed": {},

	• bounding box defining opposite corners of the available region • series is time slice data required for secondary call for layer imagery		"windSpeedFcst": {} } }
nativeZoom	The native zoom level is the default zoom level for the corresponding image.	integer	6
maxZoom	The max zoom level is the maximum zoom level available for the corresponding image.	integer	11

bb	The bounding box (bb) defines the top left tile (tl) and bottom right (br) tile of the bounding box using the geocode locations defined by latitude (lat) and longitude (lng) tile address scheme. The bb (bounding box for valid tile addresses, defined by opposing geocodes) & Equates to Layer Tile Input - Valid X:Y:Z addresses within the bounding box, defined by two geocodes.
	tl : Top Left Corner — lat: top left latitude, lng: top left longitude
	br: Bottom Right Corner — lat: bottom right latitude, lng: bottom right longitude
	Base Map tile address: e.g.
	• Google = XYZ scheme
	• Mapbox = XYZ scheme
	• Bing = Quadkey scheme
		decimal	"bb": {
			"tl": {
			"lat": "**-180.05**",
			"lng": "**90.05**"
			},
			"br": {
			"lat": "**180.05**",
			"lng": "**-90.05**"
			}
			},

tl	The response which defines the top left tile address defining the bounding box of the layer, tile addresses falling outside the bounding box will always be empty.	decimal	"lat": "**-180.05**", "lng": "**90.05**"
br	The response which defines the bottom right tile address defining the bounding box of the layer, tile addresses falling outside the bounding box will always be empty.	decimal	"lat": "**180.05**", "lng": "**-90.05**"
series	The series provides the relevant details required to pull the tiles associated with a layer, with the details contained in an array of values, associating each available time slice (ts) with a set of corresponding forecast time slices (fts).	epoch	{ "ts": **1437425100**, "fts": [**1437445800**] },
ts	The time slice (ts) is an Epoch formatted time stamp. The example (ts) equates to: GMT: Mon, 20 Jul 2015 20:30:00 GMT	epoch	**1437424200**
fts	Forecast Time Slice (fts) is an Epoch formatted time stamp. The example (fts) equates to: GMT: Tue, 21 Jul 2015 02:00:00 GMT	epoch	**1437444000**
Tile Layers			
ts	The time slice (ts) is an Epoch formatted time stamp. The example (ts) equates to: GMT: Mon, 20 Jul 2015 20:30:00 GMT	epoch	**1437424200**
fts	Forecast Time Slice (fts) is an Epoch formatted time stamp. The example (fts) equates to: GMT: Tue, 21 Jul 2015 02:00:00 GMT	epoch	**1437444000**
xyz	The xyz is the tile address scheme. Each tile is given an X and Y coordinate ranging from (0) in the upper left to (2^{zoom} -1, 2^{zoom} -1) in the lower right of a Mercator Projected map. • x ranges from 0 (left edge is 180°W) to 2^{zoom} -1 (right edge is 180°E) with TileX = floor(mapPixelX / 256) • y ranges from 0 (top edge is 85.0511°N) to 2^{zoom} -1 (bottom edge is 85.0511°S) with TileY = floor(mapPixelY/256) • z is the zoom level defined for the image	integer	**0:0:1**

JSON Sample - Product Series Info:

The Image Tile Server API will serve a series info in Json / Jsonp, which will describe the time slices which are currently available, the native zoom for the layer, the maximum zoom for the layer, and a bounding box confining the layer.

tempChange:
https://api0.weather.com/v3/TileServer/series/product/tempChange?apiKey=xxxxxxxx


```
{
    "nativeZoom": 5,
    "maxZoom": 13,
    "bb": {
        "tl": {
            "lat": "90.05",
            "lng": "-180.05"
        },
        "br": {
            "lat": "-90.05",
            "lng": "180.05"
        }
    },
    "series": [
        {
            "ts": 1575389100
        },
        {
            "ts": 1575388200
        },
        {
            "ts": 1575387300
        },
        {
            "ts": 1575386400
        },
```

```
        {
            "ts": 1575385500
        },
        {
            "ts": 1575384600
        },
        {
            "ts": 1575383700
        },
        {
            "ts": 1575382800
        }
    ]
}
```


JSON Sample - The Series List:

The Image Tile Server API will serve a series list, in Json / Jsonp, which will describe the layers that are available, the time slices which are currently available, the native zoom for the layer, the maximum zoom for the layer, and a bounding box confining the layer. The Series list will contain entries for each layer such as:

Current Conditions Layer: dewpoint	**Forecast Layer: cloudsFcst**

{
"seriesInfo": {
"dewpoint": {
"nativeZoom": 4,
"maxZoom": 13,
"bb": {
"tl": {
"lat": "-180.05",
"lng": "90.05"
},
	{
	"seriesInfo": {
	"cloudsFcst": {
	"nativeZoom": 5,
	"maxZoom": 13,
	"bb": {
	"tl": {
	"lat": "-180.0",
	"lng": "90.0"
	},
	"br": {

```
"br": {
"lat": "180.05",
"lng": "-90.05"
}
},
"series": [
{
"ts": 1458304200,
"fts": []
},
{}, (Additional Responses From the “clouds” series collapsed for presentation only)
]
},
"cloudsFcst": {}, (Layer & Series data collapsed for presentation only)
"dewpointFcst": {},
"feelsLike": {},
"feelsLikeFcst": {},
"precip24hr": {},
"precip24hrFcst": {},
"radar": {},
"radarAustralian": {},
"radarFcst": {},
"rwi": {},
"satradFcst": {},
"snow24hr": {},
"snow24hrFcst": {},
"temp": {},
"tempChange": {},
"tempFcst": {},
"uv": {},
"uvFcst": {},
"windSpeed": {},
"windSpeedFcst": {} (Additional layers omitted for presentation only)
}
}
```

```
"lat": "179.959936523",
"lng": "-90.00000762939453"
}
},
"series": [
{
"ts": 1458304200,
"fts": [
1458329400,1458328500,1458327600,1458326700,1458325800,1458324900,1458324000,14583231
00,1458322200,1458321300,1458320400,1458319500,1458318600,1458317700,1458316800,145831
5900,1458315000,1458314100,1458313200,1458312300,1458311400,1458310500,1458309600,1458
308700,1458307800,1458306900,1458306000,1458305100]
},
{
"ts": 1458303300,
"fts": [] (fts Series data collapsed for presentation only)
}
]
},
"dewpoint": {}, (Layer & Series data collapsed for presentation only)
"dewpointFcst": {},
"feelsLike": {},
"feelsLikeFcst": {},
"precip24hr": {},
"precip24hrFcst": {},
"radar": {},
"radarAustralian": {},
"radarFcst": {},
"rwi": {},
"satradFcst": {},
"snow24hr": {},
"snow24hrFcst": {},
"temp": {},
"tempChange": {},
"tempFcst": {},
"uv": {},
"uvFcst": {},
"windSpeed": {},
"windSpeedFcst": {} (Additional layers omitted for presentation only)
}
}
```


Address Tile Scheme

Converting between QuadKey and XYZ:

The subsequent tile layer requires a tile address in the XYZ scheme. The XYZ parameters must be integer coordinates describing the tile position according to the XYZ tiling scheme.
The tile address format is determined by the underlying base map that a client chooses to use. For example:

- Google uses XYZ scheme
- Mapbox uses XYZ scheme
- Bing uses the QuadKey scheme

The Bing Base Map tile address requires conversion from QuadKey to the XYZ scheme; see linked reference: - Bing Maps Reference - https://msdn.microsoft.com/en-us/library/bb259689.aspx.

Example code to convert the QuadKey tile address to XYZ scheme

```
object QuadKey {
  def getQuadKey(x:Int, y:Int, level:Int):String = {
    val quadKey = new StringBuilder()
    (level to 1 by -1).foreach( zoomLevel => {
      val mask = 1 << (zoomLevel-1)
      quadKey.append(appendValue( (x & mask) != 0, (y & mask) != 0) )
    })
    quadKey.toString()
  }
  def appendValue(xMask:Boolean, yMask:Boolean):Int = (xMask,yMask) match {
    case (true, true) => 3
    case (_, true)    => 2
    case (true, _)    => 1
    case _            => 0
  }

  def getXYZoom(quadKey:String):XYZ =
  {
    var x = 0
    var y = 0
    var zoom = quadKey.length

    (zoom to 1 by -1).foreach(i => {
      val mask = 1 << (i - 1)
      val cell = quadKey.charAt(zoom - i).toInt
      if ((cell & 1) != 0)
      {
        x = x + mask
      }
      if ((cell & 2) != 0)
```

```
    {
      y = y + mask
    }
  })
  XYZ(x, y, zoom)
}}
```

Base Map Implementation: Google

Using the Google API, a custom weather layer is done by extending the ImageMapType. The Google API will make a number of calls to the ImageMapType.getTile() when the layer is displayed. The getTile() function takes the tileCoord: Point, and a zoom: Int variable, which create the XYZ parameter needed in the Tile request url.

Weather Imagery Layers: Color Palette Legends

Please use SSDS Catalog for additional information on palettes.

Clouds, Radar, & Satellite

cloudsFcst : Forecast Layer - Clouds
satradFcst : Forecast Satellite / Radar Layer - Satellite & Radar **[base palette, overlayed by radar]**

Color	RGB	Value (% cloud cover)
	32,33,34	15%
	54,55,56	25%
	109,110,111	50%
	164,165,166	75%
	219,220,221	100%

radar : Current Radar Layer - Radar (North American Composite)
radarAustralian : Current Radar Layer - Radar Australia (Attribution Required)
radarEurope : Current Radar Layer - Radar Europe
radarFcst : Forecast Radar Layer - Radar
satrad : Current Satellite / Radar Layer - Satellite & Radar **[overlay palette, used over grayscale satellite]**
satradFcst : Forecast Satellite / Radar Layer - Satellite & Radar **[overlay palette, used over cloud cover]**
twcRadarHcMosaic : Current Radar Layer - Radar Mosaic High-Coverage
twcRadarMosaic : Current Radar Layer - Radar Mosaic

Color	RGB	Value (dBZ)	Approximate Value (Precip in / hr)
Rain			
	99, 235, 99	5	Trace
	99, 235, 99	10	Trace
	28, 158, 52	20	Trace
	0, 63, 0	34	0.10

	251, 235, 2	35	0.25
	238, 109, 2	40	
	210, 11, 6	45	1.25
	169, 5, 3	55	4.00
	128,0,0	65	16+
	255,255,255	70+	
Freeze			
	188, 165, 240	5	
	188, 165, 240	10	
	179, 155, 231	15	
	170, 146, 223	20	
	161, 137, 214	25	
	152, 127, 206	30	
	143, 118, 197	35	
	134, 109, 189	40	
	130, 104, 186	45	
	122, 96, 178	50	
	114, 87, 170	55	
	106, 78, 163	60	
	98, 70, 155	65	
	90, 61, 147	70	
	82, 53, 140	75+	

Mix			
	255, 160, 207	5	Trace
	217, 110, 163	30	0.10
	192, 77, 134	45	1.25
	174, 51, 112	55	4.00
	146, 13, 79	70+	
Snow			
	138, 248, 255	5	Trace
	138, 248, 255	10	0.10
	110, 203, 212	20	0.25
	82, 159, 170	30	1.25
	68, 137, 148	35	4.00
	40, 93, 106	45	8.00+
	13, 49, 64	55+	

euVisSat : Current Satellite Layer - Satellite Europe - Visible Spectrum
satVis : Current Satellite Layer - Visible Spectrum
sat : Current Satellite Layer - Satellite
satrad : Current Satellite / Radar Layer - Satellite & Radar **[base palette, overlayed by radar]**
ussat : Current Satellite Layer - Satellite U.S.

Color	RGB	Value (Height)
	138,138,138	Lowest
	166,166,166	
	194,194,194	
	222,222,222	
	250,250,250	Highest

euIrSat : Current Satellite Layer - Satellite Europe - Longwave Infrared

Color	RGB	Value (Height)
	89,89,89	Lowest
	127,127,127	
	152,152,152	
	175,175,175	
	210,210,210	
	175,145,193	
	157,117,177	
	139,89,161	
	116,55,133	
	183,119,22	

	170,96,21	Highest

thermalSat : Current Satellite Layer - Satellite - Thermal IR

Color	RGB	Value (Height)
	29,29,29	Lowest
	85,85,85	
	144,144,144	
	188,188,188	
	201,201,201	
	206,206,206	
	212,212,211	
	217,217,216	
	222,222,221	
	228,228,225	
	235,235,235	
	160,210,225	
	140,192,225	
	78,138,219	
	64,125,218	
	65,114,67	
	78,255,52	
	222,232,82	
	245,242,46	

	254,192,39	
	222,140,40	
	206,81,25	
	231,28,21	
	175,25,20	
	170,10,17	
	110,10,20	
	123,12,64	
	128,17,75	
	130,20,85	
	150,41,124	
	160,57,150	
	179,77,182	
	201,105,213	
	230,142,252	Highest

Dewpoint

dewpoint : Current Conditions Layer - Dewpoint
dewpointFcst : Forecast Layer - Dewpoint

Color	RGB	Value (Temp F)
	255,175,0	-40
	255,245,0	-20
	215,210,55	0

	175,190,85	20
	0,255,0	40
	0,175,0	60
	0,60,0	80+

Feels Like

feelsLike : Current Conditions Layer - Feels Like
feelsLikeFcst : Forecast Layer - Feels Like

Color	RGB	Value (Temp F)
	40,10,70	-70
	80,50,130	-50
	160,130,190	-30
	110,0,70	-10
	205,95,200	10
	90,120,185	30
	25,30,150	40
	115,105,100	50
	0,0,0	*51-79*
	220,40,0	80
	245,125,200	100
	240,20,110	120

Lifestyle Index

achesPainsFcst : Forecast Lifestyle Index Layer - Aches and Pains

Color	RGB	Value
	110,110,110	1 (minimal)
	214,196,103	3
	224,142,19	5
	233,76,0	7
	136,17,12	9 (very high)

breathingFcst : Forecast Lifestyle Index Layer - Breathing

Color	RGB	Value
	160,160,160	0
	232,40,8	1 (very poor)
	232,128,16	3
	232,200,24	5
	120,200,16	7
	48,128,32	9 (very good)

grassPollenFcst : Forecast Lifestyle Index Layer - Grass Pollen
ragweedPollenFcst : Forecast Lifestyle Index Layer - Ragweed Pollen
treePollenFcst : Forecast Lifestyle Index Layer - Tree Pollen

Color	RGB	Value
	49,209,39	1 (low)
	234,186,42	2
	238,113,32	3
	215,21,32	4 (very high)

Precipitation & Snow

precip1hr : Current Conditions Layer - Precipitation 1 Hour
precip24hr : Current Conditions Layer - Precipitation 24 Hour
precip24hrFcst : Forecast Layer - Precipitation 24 Hour

Color	RGB	Value (In)
	100, 255, 100	0.01
	71, 187, 71	0.05
	71,136,71	0.1
	0,117,0	0.25
	0,81,0	0.5
	255,255,100	1.0
	222,163,0	2.0
	214,68,30	4.0
	255,0,0	6.0
	157,0,0	8.0+

precip1hrCumulativeFcst : Forecast Layer - Precipitation 1 Hour Cumulative
precipAndSnow1hrCumulativeFcst : Forecast Layer - Precipitation and Snow 1 Hour Cumulative **[base palette, overlayed by snow]**

Color	RGB	Value (In)
	36,196,19	3
	31,149,18	25
	31,115,17	50
	255,198,15	75
	255,105,25	125
	255,13,7	200
	255,64,210	300
	255,179,255	450
	235,235,235	600

precipAndSnow1hrCumulativeFcst : Forecast Layer - Precipitation and Snow 1 Hour Cumulative **[overlay palette, used over cumulative precipitation]**
snow1hr : Current Conditions Layer - Snow 1 Hour
snow1hrCumulativeFcst : Forecast Layer - Snow 1 Hour Cumulative
snow24hr : Current Conditions Layer - Snow 24 Hour
snow24hrFcst : Forecast Layer - Snow 24 Hour

Color	RGB	Value (In)
	8,193,230	0.01
	8,155,186	1.2
	8,123,153	2.8
	161,145,255	4.7
	150,96,255	7.9
	104,42,186	11.8
	255,73,145	17.7
	235,165,226	23.6

snowCoverageConus1hr : Current Conditions Layer - Snow Coverage 1 Hour Contiguous US

Color	RGB	Value (In)
	8,193,230	1
	8,155,186	2
	8,123,153	3
	161,145,255	4
	150,96,255	5
	104,42,186	6
	255,73,145	7
	235,165,226	8

Road Weather Index

rwi : Current Conditions Layer - Road Weather Index

Color	RGB	Value
	255,253,183	Windy
	255,253,148	
	255,251,116	
	255,251,92	
	248,168 59	Foggy
	130,198,153	Wet
	130,198,153	
	123,197,145	
	116,197,137	
	109,196,129	
	102,196,122	
	95,195,114	
	88,195,107	
	81,194,99	
	74,194,92	
	67,193,84	
	60,193,77	
	52,192,69	
	43, 174, 249	Ponding

	41, 163, 249	
	39, 152, 249	
	37, 141, 249	
	35, 130, 249	
	33, 119, 249	
	31, 108, 249	
	29, 97, 249	
	27, 86, 249	
	25, 75, 248	
	23, 64, 248	
	20, 52, 247	
	205, 205, 205	Snowy
	200, 200, 200	
	196, 196, 196	
	191, 191, 191	
	187, 187, 187	
	182, 182, 182	
	178, 178, 178	
	173, 173, 173	
	169, 169, 169	
	164, 164, 164	
	160, 160, 160	
	155, 155, 155	

	251, 152, 181	Icy
	251, 146, 177	
	251, 140, 173	
	251, 134, 168	
	251, 128, 164	
	251, 122, 160	
	251, 115, 155	
	251, 108, 150	
	251, 102, 146	
	251, 95, 141	
	251, 89, 137	
	250, 82, 132	

Temperature

24hrMaxTempFcst : Forecast Layer - Temperature 24 Hour Maximum
24hrMinTempFcst : Forecast Layer - Temperature 24 Hour Minimum
maxTemp : Current Conditions Layer - Temperature Maximum
minTemp : Current Conditions Layer - Temperature Minimum
temp : Current Conditions Layer - Temperature
tempFcst : Forecast Layer - Temperature
tempHourlyFcst : Forecast Layer - Temperature Hourly

Color	RGB	Value (Temp F)
	40, 10, 70	-70
	80,50,130	-50
	160,130,190	-30
	110,0,70	-10
	160,50,140	0
	205,95,200	10
	170,225,250	20
	100,125,190	30
	20,20,150	40
	115,105,100	50
	215,215,50	60
	220,150,0	70
	220,40,0	80
	150,0,0	90
	245,125,200	100
	210,210,210	110
	240,240,175	130

tempChange : Current Conditions Layer - Temperature Change

Color	RGB	Value (Temp F)
	50,30,100	-55
	35,20,135	-45
	15,10,175	-35
	0,0,220	-25
	90,105,235	-15
	180,210,255	-5
	215,215,50	+5
	215,155,25	+15
	220,90,0	+25
	220,40,0	+35
	150,0,0	+45
	150,0,60	+55

Thunder

thunder12hrFcst : Forecast Layer - Thunder 12 Hour

Color	RGB	Value
	244,134,28	1, 2 (thunder possible, expected)
	181,9,15	3, 4 (severe thunderstorms possible, likely)
	255,255,255	5 (high risk of severe thunderstorms)

Ultraviolet

uv : Current Conditions Layer - Ultraviolet (UV)
uv12hrFcst : Forecast Layer - Ultraviolet (UV) 12 Hour
uvFcst : Forecast Layer - Ultraviolet (UV)

Color	RGB	Value (Index)
	90,85,80	1-2
	120,120,115	3
	150,150,150	4
	140,110,90	5
	190,175,80	6
	240,240,63	7
	220,135,20	8
	220,75,15	9
	220,15,15	10
	215,65,140	11

Wind Speed

windSpeed : Current Conditions Layer - Wind Speed
windSpeed12hrFcst : Forecast Layer - Wind Speed 12 Hour
windSpeedFcst : Forecast Layer - Wind Speed
windSpeedFcstNM : Forecast Layer - Wind Speed Non-Masked
windSpeedGust : Current Conditions Layer - Wind Speed Gust
windSpeedNM : Current Conditions Layer - Wind Speed Non-Masked

Color	RGB	Value (mph)
	70,210,255	10
	65,190,255	15
	25,120,255	20
	0,70,190	25
	0,50,170	30
	0,25,130	35
	0,0,90	40
	50,5,120	45
	100,15,150	50
	130,5,125	55
	165,0,100	60+

Document Revision History

Revision	Date	Notes
1.0	Dec 7, 2018	Initial versioned document; addition of Document Revision History In document header, addition of Usage Classification and addition of Attribution Requirements for Canada In table listing Current Conditions Layers, addition of "Satellite," "Satellite & Radar," and "U.S. Satellite" In table listing Forecast Layers, clarification with the "Radar" layer name changed to "Radar Forecast"
1.1	April 30, 2019	Adjust Snowfall 24 hr to match updated palette
1.2	July 3, 2019	Addition of 24 paletted image products, including new color palette legends Substantial restructuring of color palette legends
1.3	April 13, 2021	